OpenAIS Symposium:

Focus Groups sessions

Eindhoven, May 23rd 2018

Supported by the Horizon 2020
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Focus group session

Please make your choice in which discussion to participate

1. **The Internet of Lights: Optimized IoT architecture for connected lighting**
   - Location: Symposium room
   - Divided in two sub-sessions:
     a. **Emphasis on IoT**, facilitators Ben Pronk and Amyas Phillips
     b. **Emphasis on OGC**, facilitators Walter Werner and Tanir Ozcelebi
   - Unlimited nr of places, no ticket needed

2. **Results from the OpenAIS Pilot**
   1. Location: Library
   2. Max nr of places: 14 → please take a ticket
   3. Facilitators: John Sayer, Christian Molinari and Ain Lazar

3. **Office lighting scenarios and use cases of the 2020's**
   1. Location: Leenderbos
   2. Max nr of places: 12 → please take a ticket
   3. Facilitators: Stefan Verbrugh, Thomas van der Werff and Jim Payne

4. **Openness and Interoperability**
   1. Location: Stippelberg
   2. Max nr of places: 10 → please take a ticket
   3. Facilitators: Jens Herter and Frank van Tuijl

5. **System Integration in a multi vendor environment**
   1. Location: Malpie
   2. Max nr of places: 8 → please take a ticket
   3. Facilitators: Henk Stevens, Paul van der Geer and Klaas de Waal

Focus group session 1:

The Internet of Lights: Optimized IoT architecture for connected lighting

Walter Werner (ZUM), Ben Pronk (PHL)

Eindhoven, May 23rd 2018

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// 1. IoT Architecture session results

- **We welcome the diversity of protocols on top of IP**
  - One Infrastructure
  - Many Applications
  - Unleashed and unbound innovation

- **Embedded Services will enable (higher level) services throughout the value and supply chain**
  - There will be innovation on the „purpose“ of available services also, enlarging the use and profit beyond the obvious.

- IP based networks provide **integration and interoperability that is not in contradiction to diversity and innovation**
  - Interoperability may be layered in mandatory - application - association - and specific, allowing for a maximum of innovation and a maximum of integrability in the same place.

- IP converged networks will encourage the landlords to see the neutral control infrastructure as part of the building investment.

Focus group session 2:

Results from the OpenAIS Pilot

John A. Sayer (JCI)

Eindhoven, May 23rd 2018

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// 2. Results Focus Group - Payback

1. Payback

1.1. Values vs hard savings

1.2. Costs of investment

1.3. Cost of Ownership

1.3.1. Software component price models not set

1.3.2. Pilot hardware is top of range based on top of range catalogue kit....there will be medium and low (vanilla) versions once volume is assured

1.3.3. Extra (IT) support costs

1.3.4. Free security updates?

1.3.5. IT support models may not fit buiding services network models

1.3.6. Hardware component considered insignificant

1.4. Influence of just energy costs - what might be direct payback time

// Results Focus Group – Stakeholder value

2. Stakeholder value

- **2.1. Property Owner**
- **2.2. Facility manager**
- **2.3. End User**
- **2.4. Lease vs ownership business models**
  - 2.4.1. Shorter leases, not much sub -owenrship
  - 2.4.2. Building flexibility to adapt with retrofit.
- **2.5. Lighting is part of hte building services fabric (like a fire detector) BUT still gets a cheap one first then a better one once there is a tenant**
  - 2.5.1. Need to break this two-time install cycle
  - 2.5.2. Main contract puts in the cheapest
- **2.6. Actually main consultant contract often have energy target for handover after 1 year SO they actually want the controls in**
- **2.7. Main and owner and anchor tenant contracts are the hard part not the FM or end user**
  - 2.7.1. Do tenants pay rent including energy so they don't care
  - 2.7.2. Who is quoting carbon use and profitting from opex saving
  - 2.7.3. HR not involved yet. BUT There is benefit in sace, personal control and better lghts
  - 2.7.4. HR do not pay for any hard install works.

// Results Focus Group - Triage

3. Triage and liability

3.1. Integration of common IT tools

3.2. Fingerpointing

3.2.1. Mulit vendor install

3.3. "Blamestorming"

3.4. Client wants one maintenance contract and one company to chasedown

// Results Focus Group – Role of Models

4. Role of models

4.1. Simulations

4.1.1. Were used and can do root cause analyisis for triage

4.1.2. And for predictive maintenance

4.2. BIM

4.2.1. Can do total lifetime

4.2.2. Needs to move from Desian aand build tthu to operate and maintain

4.3. Lifecycle models

4.3.1. Mismatch in expected lifecycles now of IT and LED and renovation cycles

4.4. Visualisations can be 3D

Focus group session 3:

Office lighting scenarios and use cases of the 2020's

Stefan Verbrugh (PHL)

Eindhoven, May 23rd 2018

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// Summary

- Few questions about the Stakeholder Interviews, a.o. whether office workers were interviewed as well
- Question about the time it took to commission the GGD pilot. Thomas answered that it went very fast
- Question about the measurement of light levels during commissioning, leading to the suggestion that you could build in light level sensors in the desk lights to measure the light level on the desk (caused by the ceiling lights)
- Question what the exact use cases are enabled by IP to the end node that are not possible with DALI. From that question an interesting discussion followed:
  - Answer: with IP to the end node, you can implement innovations that were not invented by the time that the IP lighting was installed
  - The sensor-suggestion that was discusses earlier in the session served as a perfect example in the discussion
  - One participant [Bernard Siessegger, Head of Global Technology Field Electronic Systems Osram] said that you can also do these kinds of things with DALI if you extend the set of DALI commands. Finally the conclusion was that these kinds of extensions lead to slower innovation and risk of command conflicts with legacy devices
- Expect the IoT tipping point to happen: Conclusion: as soon as there is a clear reason for stakeholders, it can go very fast

Focus group session 4:

Openness and Interoperability

Jens Herter (Zum)

Eindhoven, May 23rd 2018

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// Discussion

- Thread: possibly interested in use cases
- Industry is reluctant in creating more standardization bodies
- Late with bringing the insights to others
- Will lighting industry drive IoT? KNX is there who claim to offer the same
- Objects and functionality are key to capturing the value
- Thread IP is going slower than expected, Zigbee (non IP) is going very well. Thread could be a migration path.
- Q3 Thread CE release
- Good example mentioned: OPC Unified Architecture for production machines. Every requires all stakeholder industries
- Suggestion to transfer Object model to DiiA
- Open Source: managed maybe, unmanaged not useful for industry

// Summary of feedback

- 1. Create an Consortium
  - Too many organizations on the market
  - Critical to setup
- 2. Make results available to existing organization
  - Good chance for some part
  - Should be on the migration path of IoT
  - Lighting specific organization like DiiA or Fairhair
- 3. Open Source
  - Unmanaged open source is critical
  - Liability is seen critical

Focus group session 5:

System Integration in a multi vendor environment

Henk Stevens (PHL)

Eindhoven, May 23rd 2018

Supported by the Horizon 2020 funding of the European Union

// Summary of feedback

See list of topics in next slides. We only addressed the first topic on “essential requirements” during the break-out session.

Summary of that session:

- Take care of “plug-and-play” devices during system integration on site. Think of 80/20 rule, so it should cover 80% of normal operation, using 20% of functionality. In fact we covered that in our “Out of the Box” requirements, which offers basic (un-commissioned) lighting controls behavior for the customer and enough functionality for installers to do their work.
- A secured network based SW update functions should be available right from the beginning, especially in case where SW is still work in progress. Also for maintenance it is important to have a reliable SW update method. Think on future SW fixes related to security.

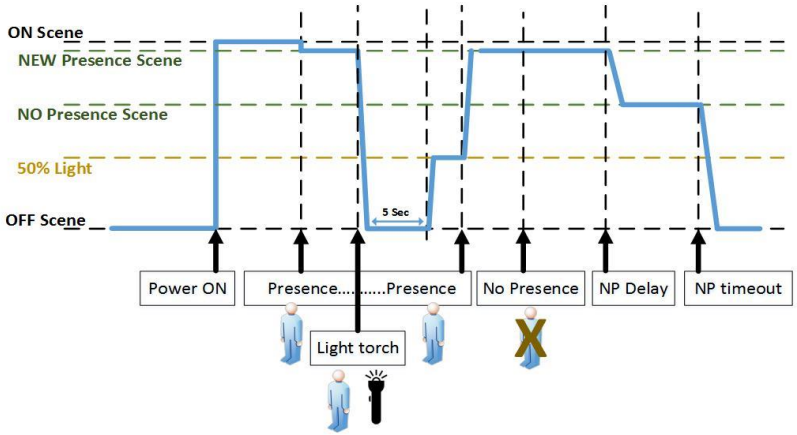
// System integration topics

- What are the essential requirements for IOT based system components during system integration at customer site?
- What is needed to debug/analyze correct functioning of an IOT based lighting system during system integration
- How to integrate with existing environment?
- A test-location to pre-test the configurations and integration process, before handing over to pilot location?
- Multi-vendor components integration

// IoT based system components

What are the essential requirements for IOT based system components during a (lighting) system integration at customer site?

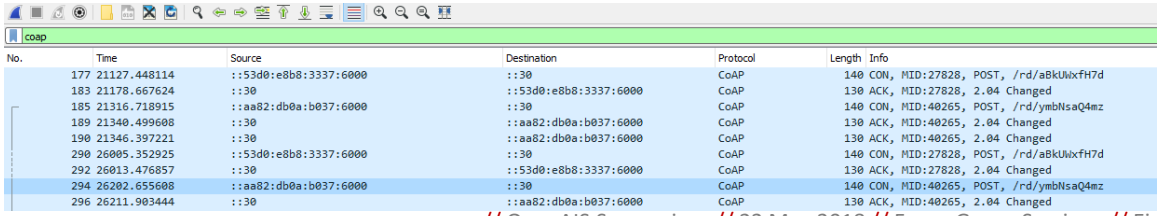
- Out of the Box requirements
  - Basic control (un-commissioned)
  - Reliable network connectivity and recovery mechanism.
  - …..
- Software update via network
  - Enough memory to store 2 images
  - ……
- …any other suggestions…



// IoT based system integration testing

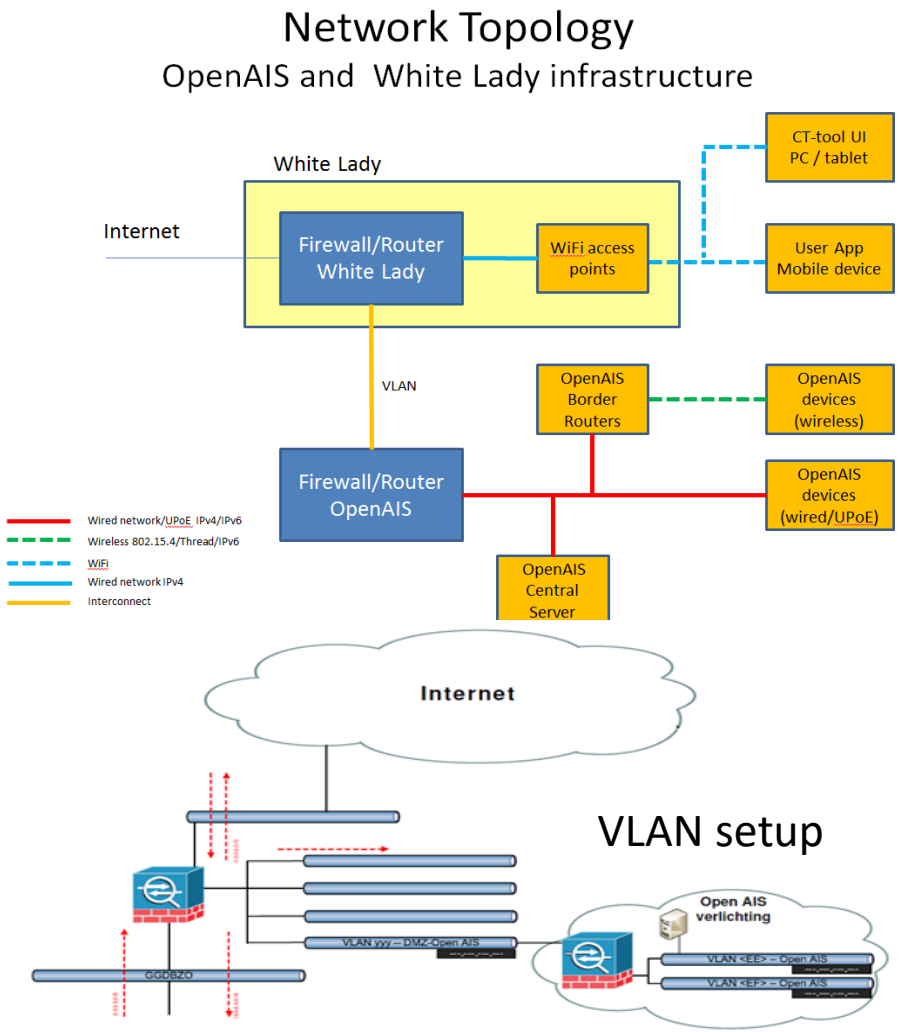
What is needed to debug/analyze correct functioning of an IOT based lighting system during system integration?

- Network analytics tools, such as Wireshark.
- Debug capabilities built into the devices
  - Event logging
  - Out-of-band signaling (e.g. event logging via telnet session)
  - Debug mode (trigger events manually)
- On-site or remote
  - ……..
- …any other debug/analyze suggestions ….



// Integration with existing infrastructure

How to plan the network integration at the customers site?



- Make network design
  - External access
  - OpenAIS network
  - Wireless (location, range, …..)
  - User App's (WiFi access)
  - ……
- Make VLAN plan
  - Separate the OpenAIS network.
  - ……
- Make cabling plan
  - Which luminaire to which port
  - ……
- Make power distribution plan
- ……any other suggestion …

// Test location versus Pilot location

A test-location to pre-test the configurations and integration process, before handing over to pilot location?

- Which scale to use?
  - 400 luminaires at pilot, how many at test location?
  - Wireless scale, wired scale.
  - Use of network emulators?
  - ……
- Testing of pilot versus OpenAIS configurations
  - Pilot configurations are only a small subset of OpenAIS configs
  - Testing OpenAIS config at test-location only?
  - ……..
- Which test to be performed at test-location?
  - Performance tests:
    - e.g. how many events can a control object process at same time?
    - e.g. multicast on wireless network?
  - Functionality tests ?
    - E.g. Occupancy based control
    - E.g. User override based control
  - ……
- ….any other suggestions…

// Multi-vendor system component integration

Which aspects to test at system components?

- OpenAIS interoperability aspects?
  - Same object model? Same code-base used, so assumption is that object model is the same?
  - Vendors use different hardware, performance issues?
  - Mix of different vendors at test-location in a configuration
  - …….
- IP connectivity aspects?
  - Same IP stack under Mbed, but different IP configurations (Full duplex/Half-duplex)
  - …….
- ….any other suggestions…

Thank you

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OpenAIS

Open Architectures for Intelligent Solid State Lighting Systems

Supported by the Horizon 2020 funding of the European Union